HYDROCOLLOIDS/GUMS

range of polysaccharide & protein

a.k.a: gums; water soluble gums

???

Functions

- primary
  - thickening agents
  - gelling or texturizing agents
- secondary
  - stabilization of emulsion
  - suspension of particulates
  - control of crystallization
  - encapsulation
  - formation of film

Classification based on....

- sources
  - derivatives from exudation or sap of trees/bushes
  - extract from .....
    - seeds
    - seaweeds
    - tubers
    - plant parts
  - microbial gums
- functional properties
  - main hydrocolloid thickeners
    - Xanthan gum
      - very high viscosity at low concentration
      - highly sheer thinning
      - maintains viscosity
        - in presence of electrolyte
        - over a broad pH range
        - temperature
    - CMC
      - viscosity
        - viscosity by addition of electrolye at low pH
    - MC & hydroxypropylcellulose
      - viscosity + temperature
        - gelation may occur
        - not influenced by addition of
          - electrolytes; or
          - pH
    - galactomannans
      - gua & locust bean gum
      - very high low-
        - shear viscosity
        - strongly shear thinning
      - x influenced by-presence of electrolyte
        - can degrade & lose viscosity
          - at high & low pH
          - when subj-->high temp.
  - main hydrocolloid gelling agents
    - Thermoreversible gelling agent
      - gelatin
        - gel forms on cooling
        - m'cules: coil-helix transition-->aggregation of helices
      - agar
      - Kappa carrageenan
        - salts; potassium salts
        - K+ bind specifically--> helices
        - salt
          - e/static repulsion <--> chains promoting aggregation
      - Iota carrageenan
      - LM pectin
        - divalent cations form gels
          - pH (3-4.5) of Ca
        - m'cules crosslinked by cations
        - pH
          - i/molecular e/static repulsion
      - Gellan gum
        - acyl gellan gels =thermoreversible at
          - salt concentration
            - NON-thermoreversible at
              - salt content
              - divalent cations
      - MC & HMC
        - gels formed on heating
        - m'cules associate -heating due to hydrophobic interaction of methyl groups
      - Xanthan gum & locust bean gum or konjac mannan
        - xanthan & polymannan chains associate-follow xanthan coil-helix transition
    - Thermoirreversible gelling agent
      - Alginate
        - gels formed
          - addition of polyvalent cation; Ca,or
          - pH
        - m'cules crosslinked by polyvalent ion
          - guluronic acid residues give buckled up conformation providing active site for cations
      - HM pectin
        - gels formed
          - at high soluble solid content (e.g 50% sugar)
          - pH
        - e/static repulsion <--> chains
          - chain association also encouraged by
            - water activity
      - Konjac mannan
      - Locust bean gum